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ABSTRACT

A description is given of an inservice course designed to acquaint teachers with current constructivist thinking and research in cognitive and developmental psychology. The focus was on sensitizing the teachers to the challenges of creating a "thinking environment" in their classrooms. The course was designed to engage students as thinkers themselves, addressing the problems of thinking-centered instruction. The students were 22 teachers, most of whom had at least 5 years of teaching experience. All of the students reported aiming for some high-level cognitive outcomes in their classes. Most reported using methods such as open-ended, higher-level questioning and responding positively to pupils' ideas. None made explicit reference to developmental levels of pupils in their pre-seminar statements, or constructivist developmental needs, or of encouraging development generally. Three major themes emerged as salient features of the course: disequilibration of the students; the role of prior knowledge in thinking; and the incorporation of constructivist concepts in the students' thinking. An outline of the course structure is followed by a report on these three themes, how the students reacted to them, and how their thinking about teaching changed. Observations are made on recent research and implications for teacher education. (JD)

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TEACHING TEACHERS ABOUT TEACHING THINKING: TOWARD A TRANSACTIONAL INSTRUCTION APPROACH

Joanne Kurfiss

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TEACHING TEACHERS ABOUT TEACHING THINKING:
Toward a Transactional Instructional Approach

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Paper presented at the annual meeting of the
Northern Rocky Mountain Educational Research Association Meeting,
Jackson Hole, Wyoming, October 11, 1985

Teacher beliefs typically include a very positive assessment of their effectiveness in developing children's concepts and thinking skills (Eisenhart, Shrur, Harding & Myers, 1985). At the same time, classroom ethnographers consistently report that thinking, meaning, and significant learning are conspicuously absent in public school classrooms in the U.S. (cf Applebee, 1981, 1984; Doyle, 1985 a and b; Langer, 1984; Sirotnik, 1983, etc.) and consequently in the writing and thinking of our students (NAEP, 1981). This paradox suggests that programs to increase teachers' ability to foster higher-level learning and development may run counter to teachers' professional self-perceptions. How can in-service and graduate teacher education programs recruit teachers to the complex counter-cultural task of reassessing and revising their teaching practices in the service of "thinking"?

About once each year I have an opportunity to work with teachers in our graduate program, an opportunity I use almost exclusively to acquaint teachers with current constructivist thinking and research in cognitive and developmental psychology. The vehicle for my "indoctrination" efforts is a course entitled "Cognitive Development and Teaching Strategy." The course changes as my understanding of their situation grows and as I broaden my own knowledge base in educational and cognitive psychology.

Each year, however, one element remains constant: these teachers,

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most of them experienced, and most several quarters into their graduate degree program, have had almost no exposure to constructivist thinking and are generally unfamiliar with literature relevant to developing the cognitive skills of their students. In many cases, Bloom's taxonomy is the closest they have come to a model of higher-level instruction: occasionally I have a student who has participated in the Utah Writers' Project summer institute, which emphasizes developing thinking skills through writing. The 22 students in my class last spring were no exception; only two had a working familiarity with Bloom, and two others had participated in the writing project. With only minimal conceptual frameworks for thinking about the problems of higher-level learning and cognitive development, these teachers may be especially vulnerable to their pupils' efforts (summarized in Doyle, 1985a) to minimize the cognitive demands of unfamiliar or intellectually challenging tasks.

In this paper, I describe my efforts to sensitize teachers to the challenges of creating a "thinking environment" in their classrooms. The course was designed to engage students' as thinkers themselves, addressing the problems of thinking-centered instruction. I will first describe the students, then briefly outline the course structure. Adopting an ethnographers' stance, I will report on three themes that seemed salient for students in the course. Finally, I will relate my observations to recent research and comment on implications for teacher education.

DESCRIPTION OF STUDENTS

In Spring of 1985, 22 graduate students enrolled in ED 665. Most had at least 5 years' teaching experience, though one was just

completing his first year, and a couple were not practicing teachers. About half had received their undergraduate degrees from Weber State.

At the first class session, students completed a short-answer questionnaire about their approaches to teaching thinking. Consistent with research summarized by Eisenhart et al. (1985), these teachers were very confident in their students' progress during the year. Nearly all reported that upon entering their classes in the fall, students were dependent and avoided intellectual demands, but that on completion of the school term, most were more confident and more "independent" thinkers. A typical response follows:

"My students' thinking skills are very poor. Many have trouble organizing appropriate order to accomplish tasks. They don't see events in logical sequences and fail to finish tasks if not directed step by step....(During the school year) They become much more independent and capable of more logical self-directed action."

Another student reports:

(My incoming students are) "shallow, problems (are) others' fault, very 'I' centered, no goals (long range), no problem solving skills, have trouble seeing into a problem in depth. (They) learn some problem solving, reaching out from 'I' to others, setting goals and making progress toward those goals."

The first statement is from a first-grade teacher, the second from a senior high school teacher.

All 22 of these teachers reported aiming for some high-level cognitive outcomes. Most of them reported using methods such as open-ended, higher-level questioning and responding positively to students' ideas. A few noted use of hands-on materials. None made explicit reference to developmental levels of students: constructivist concepts such as matching learning experiences to students' developmental needs, or of encouraging development generally, were absent from these initial protocols. Learning as acquiring information

and developing understanding of specific concepts dominated their concerns, with occasional reference to development of skills for solving problems--generally of the "stop-and-think" variety. In terms of a developmental taxonomy described by Ammon, Hutcheson, & Black (1985), the questionnaires suggested a predominantly pre-constructivist or mechanistic model of teaching, roughly at levels 2 & 3 in a 5-level sequence.

This rough estimate of my students' initial thinking receives further support from an analysis of the questions they raised in an exercise on the first day of class. Of 25 questions categorized, I found only three which could be classified as application or analysis questions according to Bloom's taxonomy. The remaining 22 often addressed complex questions as though they could be answered with factual or descriptive information. For example, one question asks, "What is the motivating factor for someone wanting to get involved in an activity or discussion?" Another asks, "How is personality related to cognitive style or cognitive abilities?" or more boldly, "How can children be taught to think?" Although the class spent considerable time on these questions, working in groups to refine them, the questions suggest an undifferentiated perspective on the complex task of designing instruction for thinking.

Despite their status as novices with respect to constructivist concepts, these teachers have a broad base of experience and contextual knowledge which provides an important foundation for further learning. It is this "tacit" knowledge, along with their genuine interest in furthering their students' development, which I hoped to capitalize on through a rather unconventional course design. In the next section, I examine some possible approaches to teaching about teaching thinking.

describe the criteria I used in selecting an approach, and briefly summarize the course that resulted from my analysis.

RATIONALE AND COURSE STRUCTURE

Zeichner, 1983 suggests a taxonomy for conceptualizing differences between teacher education programs (illustrated in Figure 1). The received/reflexive dimension refers to the interaction between students and knowledge: passive acceptance vs. active inquiry. The problematic/certain dimension represents the degree of epistemological uncertainty to which students are exposed in thinking about course content. Some of the major approaches to teaching teachers about thinking can be characterized in terms of Zeichner's categories. For example, the behavioral or craft quadrant is exemplified by "thinking skills" curricula, such as Instrumental Enrichment or Cognitive Process Instruction. These programs train teachers to focus directly on specific thinking skills such as making inferences or analyzing assumptions. "Philosophy for Children" may be considered a highly developed skills approach. Approaches emphasizing both formal and informal logic may be classified here. Most such programs are designed to be "teacher-proof," i.e., they can be transferred more-or-less intact to trainees' classrooms. Also representative of the received/certain quadrant is the traditional lecture/discussion course or program which presents research relevant to cognitive development and thinking skills of children. This approach could, of course, include reports on thinking skill development programs. Zeichner's inquiry-oriented quadrant might be exemplified by the experiential learning approach described by Kolb (1984). In this model, learners concretely experience phenomena under study, reflect on

their experience, generate and/or study theories about it, and experiment to test hypotheses derived from their interpretative efforts. Kolb's approach, most often associated with adult education, shares assumptions and characteristics with Freire's model of critical teaching (Freire, 1970). I refer to these as "transactional" models because they bring the experiences and frames of reference of the learner into the learning process, and view the teacher as a peer with different experiences and frames of reference, rather than as the "authority" or expert aloof from her students.

In teaching this course in the past, I've emphasized a species of the skills or craft approach, presenting the Piagetian learning cycle (Karplus, 1971; Bybee & Sund, 1982) and rehearsing it with the class in various contexts. And while their final products reflected a pretty fair ability to design learning cycles (Kurfiss, 1984), I sensed a dutiful quality about their lesson plans which smacked of "psyching out the instructor." I wondered how many of them would go to the trouble of designing learning cycles on a regular basis. Learning cycles seemed to be a solution to a problem which they had not yet discovered. I had attempted to impose my way of thinking on my students, trying to get them to "see" the value of using learning cycles but not taking into account their own theories of learning, their conceptions of their students, and their models of good teaching. This time around I wanted to design an inquiry-oriented approach.

In considering my options, as outlined above, it seemed paradoxical to teach teachers about teaching thinking by presenting them with pre-packaged skills curricula. It would have been acceptable to present various approaches and critique them, but resources for doing so were not available to me at that time. Teaching about

research seemed problematic for reasons outlined by Bolster (1984), i.e., most research is based on assumptions and situations alien to the classroom teachers' experience. (However Driscoll, 1984 has described an inquiry-centered methodology which successfully encourages critical reflection on teaching implications of research.) I was intrigued by the implications of the transactional model, particularly because I believe that my limited K-12 classroom experience disadvantages me when theory must be translated into practice. On the other hand, my theoretical background and analytical skills might be useful resources in helping teachers articulate and examine assumptions underlying their teaching behavior, paving the way toward greater "critical consciousness" (Freire's term) about the messages they were giving their students about school work.

I decided to attempt an experiential approach that would give these teachers an opportunity to wrestle with the challenges of serious inquiry relevant to the topic of teaching thinking. I thought perhaps I could stimulate critical reflection by challenging them to observe their own responses to difficult intellectual work, and also by asking them to justify their teaching plans on theoretical and/or empirical grounds. By helping them to re-examine their experience and their assumptions about it, I might be able to achieve something more fundamental than an "indoctrination" into the use of learning cycle "technology." I might be able to create conditions which would make literature on learning, development, cognitive processes, and developmental instruction relevant--even compelling-- to these teachers. In part, I wanted them to refine their ability to assess the thinking potential of lesson materials available to them for classroom use. But more than that, I hoped they would internalize an orientation

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to thinking so that it would begin to permeate their classrooms, rather than surfacing as an occasional special project or being presented as a set of skills separate from the "real" curriculum. In Freire's terms, I set out to stimulate "critical consciousness" by "problematizing" the teaching of thinking.

My method, which I'm not recommending anyone emulate, involved altering the classroom structure by withdrawing a number of supports typically provided for students. The students were given primary responsibility to discover relevant problems and issues, and to formulate a path of inquiry that suited their needs and learning styles. A few specifics will give the flavor. 1) On the first night of class, I reviewed the syllabus, which described four tasks students would complete during the term. We then formed teams; each team proposed grade weights for the four projects and presented its plan to the entire class, which then came to consensus on the weights. 2) Each team was to address the problem of "teaching thinking" from one f four broad perspectives, roughly analagous to the four phases of Kolb's experiential learning model. The four groups were theory, research, models, and observations. Each was given a very rough description of its mission (as a basis for individual choice of which group to work with) and encouraged to formulate a plan. The final product was to be something useful for the other teachers in the class, drawing on what group members have learned in their investigations. 3) Individual projects included an observation of "thinking" in progress (used as the basis of a definition exercise in class), a journal, and a lesson plan. The lesson plan had to include a statement of the assumptions on which the lesson design was based, a rationale in support of the assumptions, and an analysis of how the lesson reflected the assumptions. 4) Class

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sessions were devoted primarily to group work, with a few mini-lectures and general discussions. 5) The text was recommended reading but students were not tested on it. In fact, there were no exams in the course.

THEMES

Three major themes emerged as salient features of the course. First and most evident was the theme of disequilibration. The second to emerge was the role of prior knowledge in thinking. The final theme, more subtle than the others, was the incorporation of constructivist concepts in the students' thinking. I will describe each of these in turn.

The somewhat unconventional format of the course unnerved students from the start. For example, although the course resembled the familiar seminar in format, for these rather independent, individualistic teacher-students, the interdependence of grading on group projects raised issues of trust and dominance immediately, reflected in questions raised and rationales given during the grade weighting exercise. Most notably, students were leary of havin a large percentage of their grades dependent on their fellow students' several openly expressed the fear that others would not do their fair share. One student, reporting in her journal on a fellow students' response to our first session, quoted him as saying, "Is she for real?" Journal entries and post-course surveys described the disconcerting effects of being asked to formulate plans for learning and to create their own structure and direction for the team projects. It took the class several weeks to realize that while I was available for guidance and suggestions, I was not going to "tell them what to do."

Fortunately, many of the students were reading the Piagetian-based text (Bybee & Sund, 1982) and of course they paid close attention whenever I lectured. From these two sources they came to recognize their state of discomfiture, reifying it with the formal label "disequilibrium." Several journal entries recorded the realization that a) they were "disequilibrated," b) it's a natural, perhaps even necessary part of learning, and (in some cases) c) it's something their students often experience when faced with challenging cognitive tasks. While I was pleased that students grasped the importance of disequilibrium as a factor in learning, I was disappointed to note that, consistent with their initial mechanistic assumptions, some students seemed to interpret "disequilibration" as a method for getting children to think, rather than as a description of one component in Piaget's model of development and the construction of new knowledge structures.

The second theme, concern about the role of prior knowledge in thinking tasks, emerged in part as a response to the students' disequilibrium. The concept of prior knowledge was introduced through two articles distributed early in the quarter (Beck and McKeown, 1984 and Glaser, 1984). These articles emphasized the significant influence of knowledge availability on children's ability to learn from and think about new material (particularly in reading comprehension tasks). Several students saw "prior knowledge" as the panacea that would save them from their disequilibrium. "If only" they had known more about (psychology, thinking, Piaget's theory, etc.), they would not have experienced such difficulty planning their projects. They seemed unaware that serious inquiry often begins with an ill-formulated problem, and that there is no single body of knowledge which alone

would have rescued them from the challenges of formulating their inquiry. Their faith in prior knowledge reflects an epistemological position in the early stages of a developmental scheme described by Perry (1970).

Constructivist thinking, the third theme emerging in the course, appeared most conspicuously in the assumptions and rationales offered for the students' final lesson plans. Although use of course concepts was encouraged here, students were not required to use developmental material in justification of their plans. In fact three students elected not to use any developmental material: their rationales were based on hemispheric concepts introduced in a student presentation. The remaining 19 students used constructivist concepts in some way, and 14 referred explicitly to developmental principles. While I won't claim these students progressed to levels 3 and 4 in Ammon's taxonomy, they did demonstrate significantly increased awareness of concepts useful for talking in constructivist terms about learning, development, and teaching.

In addition to noting constructivist thinking in their lesson plan rationales, I examined questions the students raised in response to a post-course survey item. These questions gave evidence that students had constructed more complex, differentiated representations of the problems of teaching thinking. Classifying these questions according to Bloom's taxonomy I found a far greater range of question types than I had noted in the first set, with only two questions clearly at the informational or definition level. Furthermore, upon comparing the students' pre- and post-course questions, I was struck immediately by the difference in character between the two sets. I had a strong sense that they were now asking "real" questions, rather than questions to

impress the teacher. Many of their questions were practical and focused, and dealt with problems arising from attempts to teach developmentally. For example, one teacher asked, "What is a good starting point when some students may be functioning at a higher level, or at several levels, to teach thinking?" One raised the question of measurement of thinking skills, skeptical (probably appropriately) that it could be done. Another wanted to know what was required to insure transfer outside the classroom. Several questioned their own ability and commitment: "I wonder if I am really doing all I should to teach my children to think. Do I just tell them how to do everything rather than let them try to find answers themselves?" "Is teaching thinking something you can do or is thinking only to be nurtured and developed?" "Will having my theory of thinking change my methods of teaching? Is this a growing process? Will I change?"

These questions provide evidence that the course succeeded in "problematizing" the teaching of thinking. Many of the questions suggest increased critical consciousness about teaching, as these teacher-students acknowledge much greater complexity in teaching thinking than their previous mechanistic models could handle. An in-depth study of the literature on thinking in the classroom could have maximum impact at this point in their education, when they have a fresh perspective on their own teaching and have recognized that they can do even more to encourage students to do the intellectual work of learning. Further instruction linking their questions with research on developmental processes and classroom interactions would be valuable in helping them progress toward the more differentiated, interactionist conceptions described in Ammon, et al.'s levels 4 and 5.

Viewing the course from a constructivist perspective myself, I

wondered whether the rather painful analytic process I coerced the students to complete in their lesson plan assignments had anything to do with the quality, broadly conceptualized, of the lessons they designed. To get a rough estimate of the relationship between lessons and rationales, I first rated each lesson plan on a three-point scale of "plus," "OK" or "minus." I used two criteria: Did the lesson seem likely to engage the children in a meaningful thinking process? and Did the lesson have a clear focus that was carried through from beginning to end? On this basis, ten lessons were rated "OK," and 12 received plusses. Then I went through the papers again and rated their assumptions, rationale, and analysis on a different three-point scale: No problems, minor problems, and major problems. "Problems" could be anything from sections omitted to a rationale that did not match the assumptions. Actually, only four papers ended up with "Major problems" identified. Ten had minor problems and 8 had no problems. Of those with no problems, 75% rated a "plus" on their lesson plans; for those with minor problems, 60% received plusses; and of those with major problems, none received a plus. These relationships suggest that teachers who can articulate the reasons for what they are doing are likely also to design lessons which have a high probability of stimulating children's thinking.

Finally, I investigated whether having a constructivist rationale was associated with having an above average lesson plan. While only one of the three non-constructivist lessons received a "+" rating, 11/19 or 58% of the others received a +. Although the numbers are small, the pattern does suggest an advantage in lesson design for those who have internalized elements of constructivist thinking.

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DISCUSSION

The inquiry-oriented approach described here seems to have added an important, if disconcerting dimension to these teachers' education; and its effects offer some insights regarding the difficulties of implementing thinking-oriented curricula in the schools. Despite the confidence they project about encouraging student thinking, the disequilibrium experienced by my teacher-students reminds us that even experienced teachers are not comfortable with self-directed inquiry. Like their own students, they are hesitant to set forth on their own in search of new knowledge. They want guidance, direction, structure, and reassurance that their grades will not suffer. They may possess relevant skills, but they are reluctant to trust themselves to exercise them "correctly." In addition, their limited knowledge of thinking skills programs and developmental processes limits their ability to construct well-designed, theoretically- or empirically- based instructional sequences. And their illusions of success may prevent them from recognizing the degree to which their students are escaping or circumventing the intellectually demanding experiences required for them to achieve their potential as learners and successful participants in our learning-oriented society.

Did my course succeed in problematizing these teachers' understanding of what it means to teach thinking? Compared to previous groups I have taught, these teachers clearly engaged deeply with the projects and topics of the course. Certainly the degree of disequilibrium observed indicates that the course affected their perceptions of themselves as learners. As one wrote at the end of the term, "A Masters student has high self expectations. To be floundering is a most disturbing experience. I prefer you tell me what you want me

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to know."

But to leave teachers simply feeling frustrated about their own learning experiences was not my intent. I wanted them to develop a critical consciousness that would turn itself to their own efforts as teachers. Fortunately, I found ample evidence that this occurred. For example, the student quoted above (who says of himself, "I like facts!") reported in the same survey that his "questioning technique has improved. I also think more often about that critical question--Am I teaching thinking?--Questioning less recall, more inferences." Other students, too, reported more critical reflection on their own teaching, primarily in journal entries. For example, one women described an incident in which she realized she was now listening more carefully for children's reasoning and helping them figure out how to approach tasks on their own, rather than correcting their errors. And a first-grade teacher reported on an experiment which he designed and implemented in an art lesson. He compared children's time-on-task and product quality when given detailed instructions from the teacher vs. freedom to explore the task on their own. (He found children much more creative in the latter condition, and they wanted more paper and time to continue; the detailed instruction group quickly finished one painting, announced they were done, and turned to other projects.) His curiosity led him to test empirically the claims and arguments brought up in class, a clear indication that for him, the course succeeded in raising questions worth pursuing.

I'm not so naive as to believe that my students are now ready to construct "thinking environments" in all their classrooms. For one thing, since I did all the coding, my "results" are subject to numerous sources of bias. Furthermore, to assert any major impact of this one

course would be folly; in contrast, graduates of a two-year developmentally-oriented graduate program at Berkeley were just beginning to incorporate constructivist concepts into their thinking about teaching (Ammon et al, 1985). Finally, I see no particular magic in the specific approach I took, and in fact the next time I teach the course, I will (as usual) change my approach in ways both minor and major.

Nonetheless, I do think the course fostered transition toward a more complex formulation of the teaching implications of developmental and constructivist concepts. My students do clearly recognize the difficulties they will face as they try to create a thinking-oriented classroom. Their awareness was captured brilliantly in their final class activity. Asked to construct and present a synthesis of what they had learned, the secondary teachers role-played a group of teachers gathered in the lounge. They portrayed a novice teacher seeking advice from a graduate of the class on how to teach thinking. As the "expert" explained key concepts and referred the novice to other resources, the rest of the "faculty" bitched about their students, counted up their years til retirement, and ridiculed the novice for trying to get kids to think ("What will the parents say?" "You'll have your hands full trying to get them to stay in their seats."). Explicitly they recognized the classroom problems they would encounter, while their skit illustrated the political problems of those who would deviate from institutional norms and challenge the attributions of veteran teachers.

While I recognize that my students may be limited in their ability to implement constructivist education, I am nevertheless optimistic

that they have begun a growth process that will continue beyond their degree program. I think they have already become more sensitive, developmentally attuned listeners to their students, a skill which will open them to further learning about children's thinking. I expect them to experiment with collaborative learning. When they encounter problems, I hope they'll have a sense of how to work at them, and will explore possible approaches rather than seeking "answers" or correct "procedures." Perhaps in some small way they'll even be able to professionalize the conversation in the teachers' lounge.

Clearly it will take much more than one course to develop the skills teachers need to make thinking commonplace in their classrooms. At the very least, teacher educators need to model thinking-oriented instruction and to help teachers become confident model learners for their students. Teachers need to be so strongly grounded in thinking-oriented instruction that they can prevent or derail attempts to avoid serious intellectual work, helping students instead to experience themselves as competent thinkers, even when they confront a new teacher after a long summer vacation.

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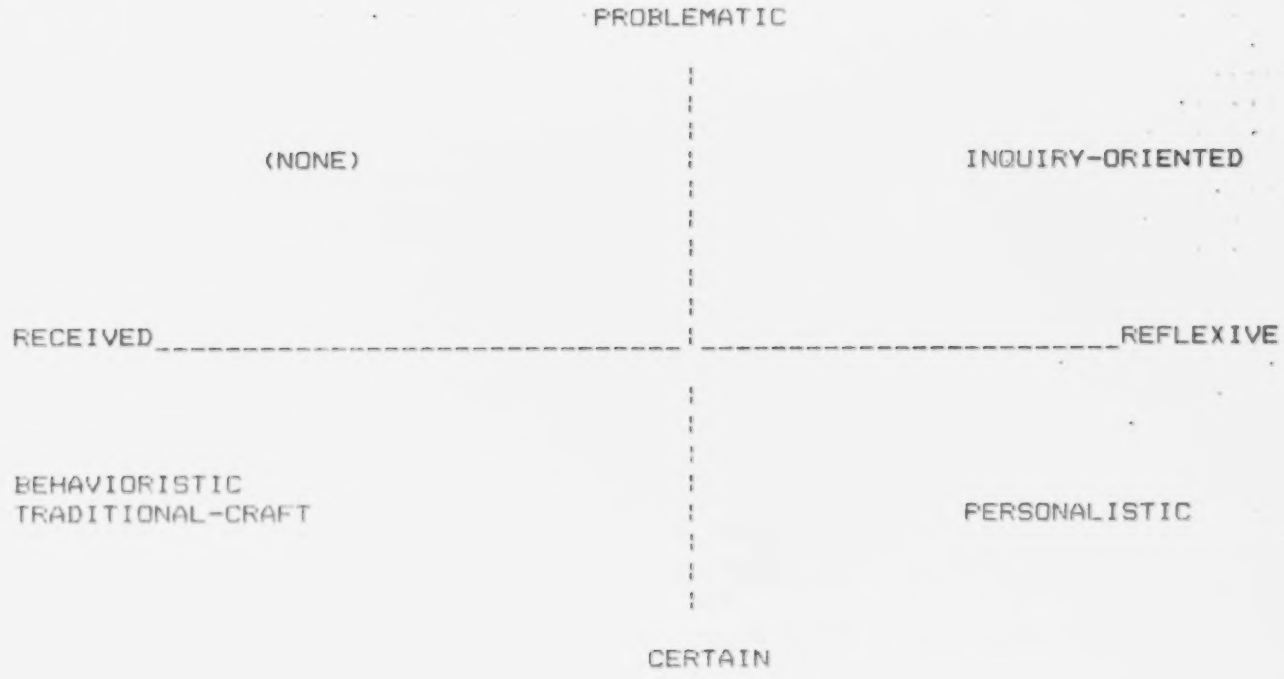

FIGURE 1. Dimensions of teacher education program paradigms. (Adapted from Zeichner, 1983, p. 7)

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